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ABSTRACT

This document presents brief descriptions of successful approaches that states, local school districts, and individual schools have taken to incorporate and/or expand the teaching of basic competencies. Two presentations made at the Southern Regional Education Board's meeting on "Strengthening the Academic Preparation of Vocational Students" appear first. "The Heart of Educational Reform: Integrating Academic and Vocational Education" (Marvin Feldman) advocates linking academic learning to practical vocational applications. "Investing in Our Children: Business and the Public Schools" (Nat Semple) also talks about the relationship between vocational education and academic instruction. The summaries of nine various approaches to strengthen basic competencies are divided into three categories. The categories and programs are Teaching, Strengthening, and Recognizing Academic Skills (The Division of Academic-Vocational Education--Holmes High School, Kentucky; The Virginia Master Technician Program; Individualized Language Arts and Systematic Teaching and Measuring of Mathematics/Vocational Applied Mathematics--Georgia; Florida's State Policy for Credit Substitution); Using Applied Courses to Develop Academic Learning Skills (Principles of Technology--The Center for Occupational Research and Development, Applied Vocational Mathematics--South Carolina, Correlated Vocational/Academic Programs--Ohio); and Remediating Basic Skills Deficiencies in Vocational Students (Individualized Remedial-Related Centers--Mississippi, Learning Resource Centers--Oklahoma). (YLB)

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Strengthening the Basic Competencies of Students Enrolled in Vocational Education

Edited by
Stephanie A. Korcheck

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SREB

Southern Regional Education Board

FOREWORD

Finding ways to strengthen the basic competencies--communicating, learning, thinking, problem-solving--of students enrolled in vocational education has been the key element in SREB's involvment in finding ways to improve secondary vocational education. Since June of 1985, when *10 Recommendations for Improving Secondary Vocational Education* was issued by SREB's Commission for Educational Quality, SREB has encouraged states to implement programs that use the practical interests of students enrolled in vocational programs as a means to strengthen their basic competencies.

Strengthening the Basic Competencies of Students Enrolled in Vocational Education presents brief descriptions of successful approaches that states, local school districts, and individual schools have taken to incorporate and/or expand the teaching of these basic competencies. We challenge states to make programs like these the rule instead of the exception.

Our thanks go to the state directors of vocational education and the individual program directors for allowing us to include descriptions of these programs in this document.

Winfred L. Godwin
President

TABLE OF CONTENTS

	Page
FOREWORD	iii
INTRODUCTION	1
SETTING THE THEME	
The Heart of Academic Reform: Integrating Academic and Vocational Education -- Marvin Feldman, President, Fashion Institute of Technology, New York	5
Investing in Our Children: Business and the Public Schools -- Nat Semple, Vice President and Secretary, Committee for Economic Development, Washington, DC	11
SUMMARIES OF VARIOUS APPROACHES TO STRENGTHEN BASIC COMPETENCIES	
Teaching, Strengthening, and Recognizing Academic Skills	
* The Division of Academic-Vocational Education--Holmes High School, Kentucky	17
* The Virginia Master Technician Program	21
* Individualized Language Arts (ILA) and Systematic Teaching and Measuring of Mathematics/Vocational Applied Mathematics (STAMM/VAM)--Georgia	25
* Florida's State Policy for Credit Substitution	31
Using Applied Courses to Develop Academic Learning Skills	
* Principles of Technology--The Center for Occupational Research and Development	33
* Applied Vocational Mathematics--South Carolina	37
* Correlated Vocational/Academic Programs--Ohio	41
Remediating Basic Skills Deficiencies in Vocational Students	
* Individualized Remedial-Related Centers--Mississippi	45
* Learning Resource Centers--Oklahoma	49

INTRODUCTION

The Southern Regional Education Board's Commission for Educational Quality issued the report *10 Recommendations for Improving Secondary Vocational Education* in June of 1985. The report holds that the first priority of secondary schools is developing students' essential learning, thinking, and problem-solving skills and notes that, "Persons who lack basic intellectual competencies will remain in dead-end jobs, and will be unable to adjust to the shifting job market in a rapidly changing economy."

One of the sharpest differences in the employment histories of better-educated versus less well-educated persons lies in the pace of advancement after gaining the first job. The lack of advancement of less well-educated persons may well stem from their inability to learn from on-the-job-training--an incapacity based on a lack of essential learning skills.

The SREB report notes that over the past five years, educators and state policymakers across the country have embraced this priority by raising graduation requirements in the basic academic subject areas for all students. The elevation of standards is needed both to motivate and to ensure learning. For too long, too little has been expected of too many secondary school students. The report recognizes that "vocational education is perceived by some as a custodial program for low ability students who cannot make it academically."

It should be noted that the largest proportion of high school students (45 percent) are in the general track programs. These students are not gaining the full benefits of either vocational or academic programs. Their school performance and high drop-out rates indicate that they are less motivated and less prepared to pursue further learning. The magnitude of the challenge increases when one realizes that nearly two-thirds of all school students are in general or vocational programs.

The real challenge in school reform is now becoming clear--not only must standards be raised but better ways must be developed and used to help a greater number and variety of students meet those higher standards. The report states that:

> Vocational education can make a vital contribution to an upgraded secondary school curriculum if it is improved and refocused so that the development of basic skills is a high priority. Vocational education must become a strong partner in the movement to produce high school graduates with the

> necessary skills for further learning--on the job or in formal education. Secondary vocational education offers an alternative approach to the development of these skills, especially for students who grasp material more readily through applications than through abstract thinking.

Both academic and vocational educators need to alter their views of skills. The focus should be on the development of skills that are essential to communicating, learning, problem-solving, and thinking. These skills are no more academic than they are vocational. The words "academic" and "vocational" describe a form of education, a curriculum, subject matter, content--in short, a way of presenting or learning something. Academic subjects such as mathematics and the social and physical sciences tend to be taught and learned theoretically, abstractly, or symbolically. Vocational content tends to be taught concretely and learned in an applied manner. It is fundamental, then, that we begin to view the essential skills not as academic or vocational skills, but as competencies that are essential to and that can be developed through either academic or vocational curricula. The development of these essential skills should be the goal of all high school programs.

The SREB report offers several recommendations and strategies to make vocational education "a full partner" in improving the essential learning and thinking skills of high school students.

- Require students in vocational programs to meet the same basic skill standards on high school competency tests as any student seeking graduation. Vocational educators should examine and redesign their curriculum to include a range and level of instruction in the same essential skills as required of academic-track students.

- Recognize and/or redesign certain vocational high school courses to meet graduation requirements, if such courses can be shown to lead to the mastery of specific learning outcomes of corresponding academic courses.

- Jointly develop, with assistance from both academic and vocational teachers, applied mathematics and science courses that take advantage of practical experiences to stress

essential knowledge and skills. Currently-offered academic courses might be improved by integrating occupational applications into the curriculum.

- Remediate deficiencies in basic reading, writing, and mathematics in poorly prepared secondary students enrolled in vocational education courses.

- Pre-service and in-service programs as well as state program and licensing standards should be evaluated and strengthened to promote the academic competencies of vocational teachers and the applied teaching skills of academic teachers.

- Each state should appoint a task force of academic and vocational teachers to design pilot courses and programs that link academic learning to practical vocational applications and meet academic graduation requirements.

The SREB report suggests that the schools badly need alternative approaches, more effective ways, for helping a majority of school students develop and strengthen essential intellectual skills. Students learn in different ways and come to appreciate education through varied interests and motives. The purpose of this document is to present some of the approaches which states, local school districts, and individual schools have initiated that address these recommendations and that strengthen vocational education's role in developing the essential skills of high school students. These programs are working. They are successful efforts and should be considered by other states planning to implement similar types of programs.

Vocational education offers an alternative to an academically-based curriculum. If embraced seriously, this alternative could encourage many more students to stay in school and achieve the first priority of secondary education--the development of strong learning and thinking skills.

THE HEART OF EDUCATIONAL REFORM: INTEGRATING ACADEMIC AND VOCATIONAL EDUCATION*

Marvin Feldman
President
Fashion Institute of Technology
New York, New York

For nearly half a century, economic policy formation was shaped by a single circumstance. On a day we still call "Black Thursday," the bottom fell out of the American economy and ushered in a great depression that lasted almost a decade. The problem was a strange, unfamiliar economic phenomenon called underconsumption--a concept that came to be called "demand side" economics, where the economy was producing more than the people could afford to buy. The cure was simply not to produce so much, and a war was declared on production that would last for 50 years.

In time, this approach matured into a set of propositions that became the basis for the watershed Full Employment Act of 1946. Unemployment was the central problem and it was the government's task to fix it. The best approach to accomplish this was a macro approach--to create employment on a grand scale by stimulating consumption. If demand were kept strong, production would take care of itself. Policy approaches that emphasized production (the supply side)--capital formation, enterprise, and manpower development--were consigned to the shadows.

Now we have entered, for better or worse, a new era. The bipartisan emphasis has shifted back toward production. This new era acknowledges once again that what is good for industry is good for the country and also re-emphasizes capital formation and productivity. More important for us in this assembly, however, is that this era will re-affirm the centrality of effective education as a primary answer to the unemployment problem. For half a century, public policymakers went to macroeconomists to solve the problem of unemployment. Now, more and more, they will be coming to educators. A supply side program is incomplete if it is concerned only with the supply of capital. It must be equally, and perhaps even more, concerned with the supply of an accurately educated work force. As Alfred Malabre, the

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*Adapted from Mr. Feldman's presentation to the Southern Regional Education Board's meeting on "Strengthening the Academic Preparation of Vocational Students."

widely-read *Wall Street Journal* columnist, said in a recent book, education is the most efficient way "to bring down joblessness with a minimum of inflationary pressure."

We are achieving some success in re-capitalization, but the educational aspect of the supply side is still a national calamity. In New York City alone, 40,000 young people drop out of school every year, and two million people read below the fifth grade level. Most of today's jobless are not unemployed because there are no jobs--as was the case in the Thirties--but because they are educationally unequipped for jobs. A declining number of people are entering the labor market. Paradoxically, there will be fewer and fewer workers, and higher and higher rates of unemployment.

The most direct approach to this kind of unemployment is education, but the system is clearly failing. We can readily measure the impact of that failure in the cost of remedial "job training" programs conducted by the public sector and the larger, less visible remedial efforts of industry. Marsha Levine and Donald Doyle of the American Enterprise Institute point out that industry spends almost as much for education as do all public postsecondary institutions. The American Society for Training and Development puts the figure at $30 billion a year, not including the wages and salaries of those being trained. The Conference Board has reported that more than a third of the companies they surveyed have some form of remedial education program in place and, in some cases, the programs are for employees with college and advanced degrees. Polaroid has offered an extensive in-house remedial program for more than 10 years. AT&T spent more than $700 million a year for education before the breakup. Beverly McQuigg, an AT&T training supervisor, puts the matter plainly: "Traditionally, Americans have relied heavily on formal schools to prepare young people to enter the labor force. This reliance is fading fast. There is a growing public perception that the school system is not keeping abreast, that there is a wide chasm between the courses schools offer and the training people need for work."

Levine and Doyle believe that the surging growth of remedial programs implemented by industry reflects the inadequacies of the public education system. "Too many workers are poorly prepared," they write, "and too many public schools are not offering the kind and quality of education employers need . . . . Business and industry are questioning the ability of public schools to produce a competent work force that is adequately and appropriately educated."

I think our educational effort is failing growing numbers of students for a reason often neglected--an unresolved question of the goals of education. For decades, the system has been trying to move in two conflicting directions at the same time. The "liberal" and the "vocational" directions have been at war with each other and, as a result, while both are essential to all students, we are realizing the goals of neither.

Those of us who hoped that this destructive conflict was at last coming to an end and the goals of education were being reconciled were saddened as the war broke out again--thinly disguised as a campaign for excellence in education. In the report ominously titled *A Nation at Risk*, we were invited to tremble at the spectre of a "rising tide of mediocrity" in education. We were told we had "been committing an act of unthinking, unilateral educational disarmament." Had it been forced upon us by an unfriendly nation, the report said, "we might have well viewed it as an act of war." Rightly understood, *A Nation at Risk* was a declaration of war not on mediocrity but on vocational education, and it suddenly put us right back to where we started.

A dozen years ago, the Carnegie Commission, after a sustained and searching examination of our educational institutions, criticized the system for offering too many young people too few alternative options. The system, the Commission said, is "too much biased toward academic subjects alone." Now, a few years later, the Excellence Commission called noisily for fewer options and a re-emphasis on academic subjects at the expense of vocational ones. It was a bold step backward.

In October of last year, the Study Group on the Conditions of Excellence in American Higher Education, sponsored by the National Institute of Education, issued a companion report to *A Nation at Risk* titled *Involvement in Learning*. Again using "excellence" as a battle-tested smokescreen, this report is an assault on vocational education at the postsecondary level. The report is at least candid--under the subhead "Warning Signals," it does not talk about a "rising tide of mediocrity," but of a "rising tide of vocationalism." More and more students are majoring in what the Commission is pleased to call "narrow specialties," more than half of them in "occupational fields."

According to the report, the proportion of non-occupational degrees awarded in four-year institutions fell from 49 percent in 1971 to 36 percent in 1982, and in community colleges it was even "worse." The proportion taking non-occupational

degrees fell from 57 percent to 37 percent in the same period. Think of it . . . college students are choosing vocational-centered curricula almost two to one. And this is the national emergency that the Study Group was established to combat. The report states it with perfect clarity: "The college curriculum has become excessively vocational." The mission of the Study Group was to reverse these trends and "to restore liberal education to its central role in undergraduate education."

Educational policy formation has become the near perfect monopoly of academic educators, in what amounts to pervasive educational segregation--not a single vocational educator served on the Excellence Commission or on the Study Group on the Conditions of Excellence in Higher Education. This great debate about the future of American education is not a debate at all. Without the participation of representatives from vocational education, which is fast becoming the dominant mode of education in America, it is merely an empty monologue. The problems of American education will not be solved by academic educators alone. They represent a part of the solution, but when they presume to provide the whole of it, the result is grotesque.

Where exactly do the excellence people go wrong?

The Study Group laments that, "Over the past two decades, parents and students have come to believe that the best insurance in the technological society is a highly specialized education that will lead to a specific job." I have come to believe that myself. But, they write, "No one knows precisely how new technologies will affect the skills and knowledge required by our future labor force." And then comes the familiar *non sequitur* on which the anti-vocational edifice has stood for nearly a century: "We thus conclude that the best preparation for the future is not narrow training for a specific job, but rather an education that will enable students to adapt to a changing world."

Where is it written that those who have a specific skill cannot adapt? Or that only those who have none can adapt? How do we know that the mastery of one skill does not enhance one's ability to adapt to another?

The academic partisanship of the Excellence Commission and the Study Group blinded them to one central point--as education has become more universal, the need to integrate the educational experience has become more urgent. Many of us have been trying for years to lay aside these old factional distinctions between academic, vocational, and general education, distinctions which are crippling our

educational effort. In spite of this, the Commission and the Study Group make an appeal for the re-fragmentation of our educational effort. They suggest choices which need not be made, divisions in what is really indivisible, and conflicts where none need exist.

We should not seek "separate but equal" attention for vocational education, but rather the full integration of our thought and practice about education. We have traditionally divided the arts to which we educate people into three separate domains: the practical arts, the liberal arts, and the fine arts. The practical arts are the arts of function--their mastery liberates people from helpless dependence. The liberal arts are the arts of meaning--they give a student a sense of context and continuity, and liberate us from a sense of isolation and futility. The fine arts are the arts of transcendence--they teach that man can create more than he can comprehend; they give the student a sense of mystery and ambiguity; and they liberate us from what is merely literal.

The American education tradition has developed in a way that made these disciplines competitive or, at the very least, that has badly blurred their proper relationships. Liberal educators must abandon the belief that only a liberal arts education can liberate students. Educational reform should not be seen as a "zero-sum" game in which the interests of academic educators are antagonistic to those of vocational educators; in which the goals of one can only be achieved at the expense of the goals of the other.

The Excellence Commission did education a great disservice by propagating a false and divisive formulation of the question. Academic and vocational education are not in conflict. They are complementary, with each having its own importance. It is not a question of either/or; it is a question of both/and. Each serves distinct and different functions, yet these functions sometimes overlap--and should.

No respectable vocational educator is opposed to academic education. Some of us have become passionate advocates of academic education. One tragic measure of the either academic or vocational approach is the rapidly growing number of students who fall between the two and are sentenced to the "general" track in secondary education. The number of students on this general track leading nowhere has increased from one in eight to nearly one in two.

What is to be done?

We need to work out a specific vision that would harmonize indispensable vocational and academic goals and provide a sure, solid sense of national

direction. There is no question that there must be a continuing reformation in American education. A system fashioned to meet one set of educational requirements for a tiny fraction of the population now needs to meet a new and radically altered set of requirements for virtually the whole population.

We need a new definition of excellence that will have meaning for everyone. We need a definition that includes excellent articulation with the known needs of labor markets and recognizes the need for saleable skills coupled with a sense of place and meaning. This definition must provide for both the specific and the general, and acknowledge that education can move both from the general to the specific and, as vocational educators have been demonstrating for decades, from the specific to the general. We need a definition of excellence which acknowledges that logical/mathematical intelligence is only one of several types of intelligence needing cultivation. Above all, we need a definition of excellence that will tend to integrate the educational enterprise and not resume the destructive process of fragmentation.

As you know, the South has taken a commendable lead in this crucial enterprise. The Southern Regional Education Board's recommendations for improving secondary vocational education urge greater emphasis on academic achievement not in the absence of vocational achievement, but as an integral part of it. "Secondary vocational education," the report's preamble reads, "offers an alternative approach to the development of (academic) skills." This is exactly the heart of the matter--the integration of liberal and vocational elements in every student's experience.

SREB's Commission for Educational Quality, which promulgated the recommendations, proposes a series of task forces of academic and vocational educators in each state to design pilot courses and programs that link academic learning to practical vocational applications and, at the same time, fulfill graduation requirements. I endorse this recommendation heartily. There is no more important educational initiative and I hope that every state in the nation will follow the South's example.

INVESTING IN OUR CHILDREN: BUSINESS AND THE PUBLIC SCHOOLS*

Nat Semple
Vice President and Secretary
Committee for Economic Development
Washington, D.C.

I would like to talk to you about the relationship between vocational education and academic instruction as presented in *Investing in our Children: Business and the Public Schools*, a report by the Committee for Economic Development (CED). This report evolved from a discussion among CED trustees several years ago in a meeting on productivity. Many of the trustees felt that the subject of productivity could not be addressed without also considering the problem of the schools. We began this study knowing that *A Nation at Risk* was coming out, and we felt that it would be very important to provide a view of education from a business perspective. Also, we assumed that by the time our report came out the impact of previous reports would have diminished and we could give another boost to the subject of educational reform. As it turns out, this has been true.

Let me tell you first about the Committee for Economic Development. The approximately 200 trustees are generally presidents or board chairmen of corporations and presidents of universities. Through this partnership, business experience and scholarship are combined to analyze issues and provide recommendations that can serve as guides for public and business policy. The membership of the CED includes senior officers from nationwide corporations--such as IBM, General Motors, Sears, McGraw-Hill, AT&T, Exxon, and Bank of America--and from regional companies--including Ralston Purina, R. J. Reynolds, Southeast Banking Corporation, Hospital Corporation of America, and Trust Company of Georgia. Education is represented by presidents from Harvard, Johns Hopkins, Carnegie-Mellon, and the State University of New York, among others. The individuals who participate in the CED take their role very seriously. There is very rarely any unanimity of opinion and, in fact, there is usually quite a variety of disagreement.

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*Adapted from Mr. Semple's presentation to the Southern Regional Education Board's meeting on "Strengthening the Academic Preparation of Vocational Students."

The CED thought that the business perspective was a very important thing to bring to bear on the subject of education. We were aware that we didn't know everything there was to know about education, but all of the people came to the discussion with a vested self-interest. Almost everyone had gone to a public school in the United States; almost all had kids in school. Regardless of whether they viewed it as important to their companies, they felt strongly about education. It was Brad Butler, Chairman of Proctor and Gamble and a graduate from a vocational school in Baltimore, who guided the committee through the long process of developing the report.

We decided to look at four areas in education we felt were critical from a business perspective. First, we wanted to identify the skills needed to assure that students graduating from school have a reasonable chance of productive employment in the business community. We did not say that schooling was everything and that everyone needs to get a job in the business community, but we felt that if someone wants to make this choice, they should be aware of the skills required for success. Second, the CED looked at the returns of investment in schooling. In the business sector, it is typical to base decisions on predicted outcomes compared to the amount of money invested. We wondered what would happen if that principle was applied to education. Third, the CED wanted to address the problems teachers are experiencing, not so much in terms of compensation, but on the structure under which teachers operate in the schools, their relationships with the administration, and how the system rewards them for teaching. Once again, we tried to compare it to the way the business community operates because we felt that many business principles could be conscientiously applied to education, at least in some kind of experimental fashion. Finally, recognizing the tremendous need for business involvement in education, we wanted to discover the best ways to leverage support from the business sector.

The members felt that the available research did not do a good job of dealing with what employers really want from graduating students, so we developed a survey that would identify the characteristics students need to possess to be employable. The survey was sent to our trustee companies as well as to the Fortune 500 companies, 6,000 small businesses, and 500 postsecondary institutions. The survey was unique because it did not go to chief executive officers (CEOs); rather, it was directed to the hiring gate--personnel offices. We did this to eliminate the traditional feeling that the CEOs' attitude is that "anyone who is articulate and comes from college with a Ph.D. is going to be okay, and I don't care if the plant

manager needs someone with technical skills." The survey was split into general categories of work--office and clerical, sales and service, technicians and semi-skilled workers--and we asked that it be reviewed by a number of people in the office to see how their responses would compare.

The responses almost universally stressed two things--communication skills and attitude. Communication skills were defined in many ways, but basically they reflected how well people are able to get along in the work place, how effectively they communicate with their peers, if they are able to learn a new skill, and if they can take on a task and see it to completion. An employee with a good attitude would come to work on time and be reasonably well-mannered. That might sound somewhat trivial, but believe me it is not in the business world--it makes people more comfortable in the work environment and adds to group productivity.

A very important point that must be established is the changing nature of work in the CED members' businesses. We are now involved in a study that demonstrates how work has changed. The popular theory that 75 percent of all new jobs are created by small businesses has not been justified by our results. Our survey showed that 55 to 60 percent of the small businesses are driven by, and react to, movement in big corporations. It seems that what is viewed from the CEO level is indicative of how things will change on the small business level. The change occurring in the world of work today results from the tremendous application of technology. For example, I used to work on an auto axle assembly line with 10 people; now the entire operation is run by one robot.

The feeling now is that productive employment will increasingly stress the skills that allow people to communicate with one another. Specific skills are required, but if people can communicate effectively, the skills can be learned. Some vocational education leaders see this as a threat and react by saying, "No, we don't want change." There are also those who see it as an opportunity to strengthen vocational education by introducing new ideas and making needed changes. These people recognize that in order to compete in education in the future, you have to deal with programs that are flexible and that train students not only in attitude, but also with specific skills.

The CED survey asked the business community to comment on vocational education and how such training would affect hiring practices. Generally speaking, those companies, particularly the larger ones, having specific skill requirements would most likely hire a college graduate, preferably with some advanced vocational training. The second choice would be a person who had vocational training coupled

with strong academic skills. Ideally, these people would come out of high school able to communicate with other workers, knowing how to run the widget, and able to learn how to build a new widget.

There was some confusion about what vocational education should be, since there was not a clear understanding of the differences between vocational education programs that serve as career exploration and those which are job specific. As a result, it was very hard to define the outcome of vocational programs. In spite of these difficulties, the CED felt that the worst kind of vocational programs are those in industrial arts or other areas that are devised as a means of keeping students in school rather than encouraging them to seek a broader base in preparing themselves for the work place. The excellent vocational education programs--some would say ironically--are those that offer occupationally-specific training supported by good academics. Not surprisingly, we found that some of the most successful vocational/occupational training came in the office occupations. Because of the availability of jobs in these fields, graduates have good work attitudes and the skills to get those jobs. We came to the conclusion that vocational education should be grounded with good academic skills and be occupationally specific, that is, designed for the purpose of preparing graduates for entry into the labor market.

Having reached that conclusion, we then asked, "How do you assure the quality of these programs?" Time and again, we saw that a vocationally-educated student with good academic preparation and the ability to learn new skills was a "pretty good sell" in the market. We stressed the point that occupationally-specific programs should emphasize and demand proper academic preparation. Although we are not in the business of telling schools or vocational educators how to go about doing this, we suggested that academics should be emphasized and tested much earlier so students who get to the third grade and cannot add one and one can be identified and placed in a program that will assist them in gaining this skill. In many cases by the time students enter occupationally-specific training, they are not equipped to master the academic skills necessary for success. This puts the vocational education community in the tough position of having to make up for years of problems in the academic area. There needs to be some way of assuring the quality of academic preparation prior to allowing a student to enter occupationally-specific training.

On the other hand, in some cases occupationally-specific training can serve the purpose of providing strong academic skills, if structured properly. Recognizing that it takes a certain type of vocational teacher to combine improved academics

with occupationally-specific training, if students respond, there is no reason why this type of training should not be a conduit to strong academic skills. At the same time, however, this approach should not be used as a way of absolving the general track and the academic track of their responsibilities. The members felt very strongly that occupationally-specific training should be seen as a reward to students choosing this path, not as a penalty or a fallback. Many felt that the level of vocational education had simply not kept up with academics, and it was absolutely critical to ensure that students come out of high school prepared in the general academic program.

What is important in vocational programs are rigorous standards so that students who get a certificate--and we recommend a different type of certificate above the usual kind--know they are a master of something. This would also assure the business community that the certificate means something. Even for those who had previously dropped out of school before entering vocational training, rigorous standards in occupational programs applied in a way that encourages this combination of academics and vocational training is the best approach. If the rigor is good and the training is good, then the end result will be a job. If programs speak to the requirements of the job, students will more readily accept the rigor of the instruction. That is a special point we try to make throughout the entire report.

Vocational education can play an incredibly important role in bringing self-discipline, attitude, and related characteristics to bear in our nation's schools. It was a tragedy and a serious mistake that the initial reports on educational reform did not give vocational education the opportunity to speak and be heard. I hope that the CED report, in its own limited way, has addressed this mistake and will initiate some new and needed discussions regarding vocational education. Once again, we do not pretend to know everything about the schools--that is the business of educators. But we do feel that our report has identified the skills that are necessary for any student coming out of the schools to succeed. We hope that people responsible for education take it to heart and do what they feel is necessary to reach that goal.

THE DIVISION OF ACADEMIC-VOCATIONAL EDUCATION

Terry Mann
Principal
Holmes High School
Covington, Kentucky

The academic-vocational division at Holmes High School in Covington, Kentucky, is based on the premise that students opting for vocational education should not have to sacrifice the extra-curricular and educational opportunities often made available only to students in other programs--opportunities such as music, clubs, athletics, and academic courses.

Traditionally, vocational students had to give up these opportunities because programs were taught away from the high school campus and courses were arranged in predetermined, inflexible blocks of time. At Holmes, however, the size of the student body and the campus allow for a full-scale vocational school, so students do not have to leave the Holmes campus to receive their vocational training. Also, the program at Holmes is four years in length, rather than the traditional two years. Since students are exposed to vocational training for a much longer period of time, the blocks of time set aside for vocational training are not absolute and can be modified to meet the needs and interests of students.

The curriculum for the academic-vocational division was designed to coordinate academic skills with the delivery of vocational instruction. Because both academic and vocational instructors worked together to develop the program and because they share the same buildings and facilities in the academic-vocational division, the

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"The math teacher now asks himself, 'How can I present this in a way that is relative and meaningful to what is happening in the auto mechanics lab?'"

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anticipated friction between the instructors never materialized. Instead, there is a new awareness as to the needs of each instructor in relation to teaching students, and communication has increased significantly.

Approximately 150 ninth-grade students enter Phase I of the academic-vocational division. Students spend two hours every day in an orientation program, mastering minimum compentencies in each of the 12 vocational areas offered at Holmes. At the same time, these students are enrolled in required academic courses--math, science, English, and social studies instruction are presented in the same competency-based format as the vocational curriculum.

In Phase II of the program, sophomores narrow their vocational training and choose three areas from the 12 in which they received instruction as freshmen. Sophomores then spend two hours each day attaining higher skills in those three areas while, at the same time, completing academic requirements and enrolling in other academic courses.

In the junior year, students are expected to choose and pursue three hours daily of advanced study in one vocational area. Juniors at Holmes have a decided advantage over students in traditional vocational programs. Holmes' students have had two years to explore all the options available in vocational education and, at

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"If you agree that our goal is the total education of the student, then I think you have to recognize that the traditional way in which we have separated vocational and academic education has been disadvantageous to our students."

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the same time, have gained valuable basic competencies in each of the 12 vocational areas. Therefore, when students must choose one area of study in the junior year, they can make knowledgeable decisions based on practical experience. Students who wish to enter the academic-vocational division in the tenth or eleventh grade may do so; however, they must master the basic compentencies prior to entering the more advanced courses in the vocational program they have chosen.

Results of the program in terms of standardized test scores and academic expectations have been extremely positive. When compared to students in the other divisions there is no significant difference in the scores on standardized tests of students in the academic-vocational division; in fact, vocational students have actually scored higher in some areas. In addition, students entering the academic-vocational division know that they will be challenged by the academic requirements of the program and will have to work hard to succeed. Of the 150 freshmen who enroll in the program, only 100 are still enrolled by the time they are seniors.

The academic-vocational division does allow vocational students to go in and out of the college preparatory division and vice versa. Junior and senior vocational students who wish to forego part of the three hours set aside for vocational

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"We should worry not only about the academic achievement of vocational students; we also should worry about academically talented students who are denied a whole world of creativity and knowledge that can be gained from the vocational setting."

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training to take more advanced courses in the college prep division may do so very easily. In fact, some of the required courses in the academic-vocational division, such as calculus and physics, are taught outside of the division and must be taken within the college prep program. At the same time, students in the college prep division may opt to take courses in various vocational areas. This flexibility in allowing all students to explore their interests and realize their full potential is clearly the strength of the program at Holmes.

THE VIRGINIA MASTER TECHNICIAN PROGRAM

Cecil Phillips
Project Director

Under the guidance and direction of the Virginia Department of Education, a "Secondary/Postsecondary Program to Prepare Master Technicians" is being developed and piloted on the Virginia Peninsula. In the Fall of 1986, the first group of students enrolled in the master technician program designed by Thomas Nelson Community College, New Horizon Technical Center, the five local school districts, and representatives from local business, industry, and government.

The master technician program responds to the need for technicians who can build, repair, and maintain complex systems. They must, therefore, be skilled in a variety of speciality areas. These systems-oriented technicians must have

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"There is a tremendous demand in Virginia for systems-oriented technicians who are 'masters' of their trade--who can assemble, operate, analyze, troubleshoot, repair, and maintain equipment."

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experience in a combination of electrical, electronics, mechanical, hydraulics, pneumatics, optics, and thermal applications.

There are four unique components of the master technician program--the 2+2 concept, the blending of academics and vocational education, maximum student flexibility, and various established partnerships. The 2+2 concept combines the last two years of high school with two additional years of training at the community college, leading to the Associate in Applied Science Degree in electronics/electromechanical technology. The unique blending of the academic disciplines of math and science with vocational programs in a comprehensive curriculum will provide students with a wide variety of educational and employment options. Maximum flexibility in choosing from these options occurs because students are equipped to enter the work force immediately upon graduation from high school; however, continuation of education in the 2+2 program or in another college-level program is always a possibility. The progress and success of the master technician program is insured through partnerships formed between secondary and postsecondary levels of education, between academic and vocational education, and between leaders of education and leaders of business, industry, and government (BIG).

Policies, procedures, and guidelines for the program are established by the Executive Committee, which consists of the vocational administrator from each school district, the dean of instruction at the community college, the director of the technical center, a representative of the superintendents, and the chairman of the Collaboration Council. Advisors to the Executive Committee are the Collaboration Council--made up of representatives from education and BIG--and representatives from the Virginia Department of Education and the Virginia Community College System.

The Curriculum Writing Team is responsible for developing the secondary and postsecondary curriculum for the master technician program. The Team consists of representatives from the disciplines of math, science, technology education, and trade and industry education. Two consulting committees review, evaluate, and advise the Writing Team on the desirability and feasibility of implementing the curriculum they have produced. The BIG Consulting Committee is made up of first-

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"What is essentially happening is that we are taking the current first-year technology program at the community college and moving it to the secondary level."

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line supervisors and technician-level workers in the field; the Education Consultant Committee provides additional specialists from the disciplines mentioned above, as well as guidance personnel.

In developing the secondary curriculum, the Writing Team first identified all of the courses necessary for students to meet graduation requirements. The Team then specified which courses were needed to complete the secondary-level curriculum based on the competencies identified and validated by BIG. Remaining competencies were infused into appropriate courses at the postsecondary level in order to complete the curriculum framework.

While certain preparatory courses in materials and processes (solid chemistry), mechanical drawing, power and transportation (mechanics, hydraulics, and pneumatics), and principles of technology (applied physics) are recommended at the ninth and tenth grades, actual entrance into the program is open to any student having the proper math and electronics background. Students can even enter the program at the college level by taking a one-year block of courses prior to enrolling, constituting a three-year block of time at the community college.

There have been strong commitments for the master technician program from both education and BIG. All levels of education have agreed to participate and allow

staff members to attend workshops, seminars, and development meetings. Business is eager to participate because they will receive graduates with the skills their businesses require. By releasing employees to assist in the development of

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"One thing that we have plenty of in this project is people who are dedicated to the path we are taking--they believe in 2+2."

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the master technician program, businesses are involved in the training of useful future employees and, at the same time, students are given the opportunity to gain practical, high-level skills that will readily translate into gainful employment or further educational opportunities.

INDIVIDUALIZED LANGUAGE ARTS (ILA)

Barbara Rous
Project Director
Brookwood School
Dalton, Georgia

and

SYSTEMATIC TEACHING AND MEASURING OF MATHEMATICS/ VOCATIONAL APPLIED MATHEMATICS (STAMM/VAM)

Nancy Williams
Project Director
Oconee School
Watkinsville, Georgia

Individualized Language Arts (ILA) and Systematic Teaching and Measuring of Mathematics/Vocational Applied Mathematics (STAMM/VAM) are projects funded by the State of Georgia which were developed from nationally-validated models. The ILA program and the STAMM/VAM project serve as state-certified centers for educational improvement. Teachers and administrators throughout the state come to the centers to observe and receive training which enables them to implement the programs into their schools' curriculum. The initial two-day training session and subsequent follow-up visits and technical assistance are provided at no cost to any school or system that has applied to and been approved by the State Department of Education. For both projects, instructional materials that include student workbooks and teaching manuals are available at minimal costs.

Individualized Language Arts (ILA)

The ILA project was implemented in Brookwood School in 1977, using the validated project from Weehawken, New Jersey, as a model. ILA can be used at any grade level to introduce students to the three aspects of writing--creative, expository, and practical--by utilizing writing activities in all parts of the curriculum. This "writing across the curriculum" method is techniques-based, not materials-based, and combines a language-experience approach with language-manipulation techniques that help students plan, write, and improve their own compositions. By writing every day in content courses as well as English classes, all students gain increased self-confidence and positive achievement as their writing skills improve. Students are also motivated to edit their own compositions and to read their work aloud, thus giving them an appreciation of writing as a vehicle for communicating ideas and

feelings and providing an effective means to reinforce other language skills, such

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"Of the three R's, writing usually received the least amount of attention. I think now the swing is in the opposite direction."

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as reading, speaking, and listening. Essential elements for the success of the ILA program include:

* writing instruction in all curriculum areas
* diagnostic-prescriptive framework
* sequential plan for skill instruction
* system to track student progress
* checklists to remind students to apply techniques in each writing lesson
* involving students in self-evaluation of their work
* planned staff development program throughout the year
* coordinating resources and involving all staff in the project

During the 1983-84 school year, the ILA project became involved with training teachers in a comprehensive high school and a need arose for writing activities that

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"Vocational teachers would receive a piece of writing and recognize that the student needed help, but the vocational instructor did not know what to do except go to the English teacher and say, 'You need to teach this or that skill in your class.'"

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would be applicable to vocational programs. Since the New Jersey model did not provide such activities, ILA staff asked vocational and English instructors and representatives from statewide vocational councils and the Department of Education

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"We are trying to show that all students have to write; maybe not a ten-page research paper or a three-page expository theme, but we all have to be able to communicate on paper in the workplace."

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to assist them in developing writing activities that would be beneficial to students enrolled in vocational education. Writing activities that enhance what is being

taught in vocational programs were developed based on the curriculum provided by vocational teachers. By utilizing the "writing across the curriculum" approach, vocational instructors know that they are not expected to be English teachers; rather, they learn techniques that they can use to improve students' writing in their vocational program. A writing activities manual for the area of transportation was piloted in 10 comprehensive high schools in Georgia and results were favorable. Three manuals--in health occupations, metals, and construction--are currently being field-tested; eventually, manuals will be produced for all of the vocational areas.

Results based on the writing activities have been very positive thus far. A pre- and post-test for transportation in the form of a three-paragraph letter was

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"Teachers' reactions to the performance of students on the pre-test were, 'I didn't know we needed this as badly as we do.' After the post-test, teachers were saying, 'I can see improvement already . . . .'"

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given to students. In the first paragraph, students explain the problem with the car; in the second, they describe what was done; and in the third paragraph, students thank the customer for their business. The response from teachers has been overwhelming in stating that students have demonstrated marked improvement in their written communication skills.

Systematic Teaching and Measuring of Mathematics/ Vocational Applied Mathematics (STAMM/VAM)

STAMM was developed in 1972 by the Jefferson County Public School System in Lakewood, Colorado, and implemented in the Oconee County Public Schools in Watkinsville, Georgia, in 1978. VAM evolved from STAMM material out of a need to provide vocational teachers with materials that would facilitate the review and/or

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"When we started to talk about incorporating math skills into vocational programs, we realized that they were already there; we just needed to identify and document these skills--show where they are taught, and keep a list of the skills students have when they enter and then when they leave."

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remediation of math skills considered basic for entry and success in vocational programs. VAM demonstrates to students in a meaningful way that the work required in

their regular math class is the same as the math performed in their vocational courses.

Workbooks in 20 vocational areas, developed from state curriculum guides, were designed jointly by committees made up of vocational and math instructors, representatives from statewide vocational councils, and the State Department of Education. After the workbooks were field-tested across the state, revision committees in each vocational area reviewed and revised the books based on input from teachers who had used them. An important result of the developmental effort was that both

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"Comments on the workbooks from vocational teachers were generally positive: 'We were apprehensive about what kind of information would be included, but we are really impressed with the results. The workbooks address the kinds of math skills that are needed and are very relevant to what we are teaching in our courses.'"

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the vocational and the math instructors had a better understanding of how math is taught and applied in each other's classes.

An instructor's guide, which includes a pre-/post-test and correlation/prescription charts, was designed to facilitate a diagnostic-prescriptive approach in using the workbooks. The purpose of the workbooks is to focus on the basic math skills students need to be successful in the various vocational programs. The books, which can be used independently by individual students, with small groups of students, or with an entire class, were designed to be mathematically correct while, at the same time, being vocationally appropriate. This gives vocational teachers relevant material they can put into use as soon as they diagnose through the use of a pre-test that a student is deficient in a certain mathematical area.

"Whoever makes the discovery that a student needs help is responsible for teaching that student . . . . Someone else might not make the discovery and then the student would be lost forever."

Vocational teachers insisted that the first part of the workbook serve to motivate students and show them vocational applications of the math skills they must master in order to be successful in that particular program. The next section includes supplemental word problems which allow students to apply math in solving

problems relating directly to the vocational area. The math appendices in the back of the workbook include a self-check, study sheet, and worksheet for each skill tested on the pre-test.

To validate the effectiveness of the workbooks, a pilot study was conducted in 18 comprehensive high schools. Test scores from the VAM pre- and post-test and from the 8th-grade criterion-referenced test or 10th-grade Georgia Basic Skills Tests were collected for 469 industrial arts students from around the state. Analysis of the scores documented statistically significant improvement in basic math skills. These results clearly show that students who need assistance in learning basic math skills can do so with the VAM materials, which apply these skills in a relevant way to their vocational area of study.

FLORIDA'S STATE POLICY FOR CREDIT SUBSTITUTION

Ron Jeffries
Assistant Superintendent
for Vocational Education
Polk County School Board, Florida

In the past several years, all of the SREB states have passed legislation or adopted policies requiring additional units for graduation from high school. These requirements have generally placed a greater emphasis on more rigorous academic preparation, especially in the areas of math and science. Vocational educators in several states have succeeded in their efforts to gain recognition for vocational programs that are equivalent in knowledge and skills to academic courses in English, math, and science.

"If fully implemented, this type of recognition will dispel the notion that vocational components in a student's high school education somehow weaken the diploma."

The Raise bill, passed by the Florida legislature during its 1983 session, increased the number of units required for high school graduation from 22 to 24, effective with the class of 1987. Another section of the Raise bill instructed the State Board of Education to develop a statewide curriculum framework for all courses offered in the schools and to define student performance standards that identify specific outcomes in all courses. The framework and standards were formulated and adopted at the state level and subsequently adopted by the local school districts.

In reviewing the student performance standards, vocational educators recognized that students in many vocational programs receive instruction in competencies that are comparable to those defined for academic courses, and felt that there should be a provision to substitute these credits for required academic courses. As a result

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"This commitment to quality education requires that courses in academic and vocational areas become more related and integrated in order to provide a more balanced curriculum to all students."

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of this recognition, all local districts must now allow students to substitute certain sequences of vocational courses for credit when the knowledge and skills

gained in vocational programs are equivalent to those in the academic areas of English, math, and science.

Credit substitution is possible only when a student completes a sequence of courses in a vocational program. Because the required academic skills are integrated into the entire program--not just one course within the program--course-by-course substitution is not permitted. For example, students may receive one science credit if they complete four courses in Agriculture--one class in Fundamentals of Agribusiness and Natural Resources Occupations and a three-course sequence in either Agriculture Production or Ornamental Horticulture. If students take only one course and do not complete the four-course sequence, they are not awarded the science credit. Under the credit substitution provision, students may satisfy up to two credits in each of the academic areas of English, math, and science.

PRINCIPLES OF TECHNOLOGY

Daniel M. Hull
President
The Center for Occupational
Research and Development
Waco, Texas

"Principles of Technology" is an applied-foundation course in science for vocational students interested in technical careers or for other students who want to learn the physical principles underlying modern technology. The course provides an understanding of the scientific principles involved in today's technology and the

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"The decision to strengthen academics is very real. Vocational education has accepted the challenge of producing 'applied-foundation courses' in the basics for the majority of students who do not pursue a degree after high school."

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math associated with them, helps students to continually adapt themselves to the workforce and its changing demands, and satisfies some of the increased science requirements for high school graduation.

Development of the "Principles of Technology" course is a cooperative activity involving a consortium of 45 state and Canadian provincial vocational education agencies in association with the Agency for Instructional Technology (AIT) and the Center for Occupational Research and Development (CORD). As members of the consortium, vocational agencies provided $3.2 million for the creation of the course. Drafts of the materials prepared by AIT and CORD were reviewed by an independent, eight-member team of specialists in vocational education and instructional media, as well as by the consortium agencies.

Designed as a two-year program, "Principles of Technology" consists of 14 units, each dealing with one principle as it applies to the four energy systems--mechanical, fluid, electrical, and thermal--that make up both simple and complex technological equipment. In each unit, the student is required to read approximately 130 pages of material, view six video programs (about 10 minutes each), attend four math labs, and work on eight hands-on, hardware-oriented learning experiences. Instruction in remedial math skills is provided when appropriate.

Students in the "Principles of Technology" course are primarily those interested in technical careers, although other students wishing to enroll may do so. To be

successful in the course, students should read at the 8th-grade level. Students should also have completed at least one year of secondary-level math; it is especially helpful if students have previously taken, or are concurrently enrolled in, a first-year algebra course, but this is not a requirement for successful completion. The kind and amount of credit students receive are determined locally

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"The high-tech revolution has resulted in a reorganized workplace and reorganized jobs. This means that vocational programs should be focused on preparing advanced, skilled workers who have a broader technical base and a better understanding of the priciples underlying the technologies."

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by examining the course materials, teaching plans, and instructional objectives for each unit. In most cases, schools award science and sometimes math credit for successful completion of the course.

A current vocational, industrial arts, or science/math faculty member or a team consisting of one instructor from each area can teach the course. In either case, instructors for the course should be familiar with, and competent in, the physics and math content of the course. In-service training has been provided in two- or three-day workshops, however, this amount of time has proved to be inadequate. CORD is working with teaching institutions to develop a 4 to 6-week extended training program.

The costs of initiating "Principles of Technology" are not considerable. Student texts, teachers' manuals, and video materials may be obtained and/or copied from the State Office for Vocational Education. Demonstration and lab equipment that is not already on hand must be purchased. The cost to fully equip each lab station--servicing 2 or 3 students--for the first year of the course is approximately $4,000 to $6,000.

During the 1984-85 school year, approximately two schools from each of the consortium's states and provinces were involved in field-testing units 1 through 7 of the course; similiar tests in the 1985-86 school year were conducted for units 8 through 14. Pre- and post-tests were given to students enrolled in the course. In each case, the post-test scores showed significant improvement over scores on the pre-test. This test data, coupled with suggestions from instructors, proved to be very useful in eliminating flaws and revising units 1 through 14.

Although no formal tests have been given to compare students enrolled in "Principles of Technology" with students in traditional vocational programs or those in the college preparatory program, two examples from individual schools demonstrate that the course can have a very positive effect in raising science and math skills.

"Students who pursue vocational-technical programs are frequently disinterested, unwilling, or incapable of learning abstract, theoretical subjects that do not appear to be relevant to life and work."

One instructor who teaches both regular high school physics and "Principles of Technology" gave an identical test to each class at the conclusion of the year. Students in the "Principles of Technology" course performed equally as well as, and in laboratory-related questions better than, those in the regular physics course. As the second example, the course was taught to 25 students in a high school machine trades program. At the end of the first year, students averaged in the 95th percentile in science and the 90th percentile in math on a standardized achievement

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"Applied or hands-on learning has been shown by vocational education to be a superior delivery system for a large number of students. This may be the most important contribution vocational education has made in the past 25 years."

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test. Clearly, these two examples demonstrate the effectiveness of the course in presenting the principles of science and math by utilizing the applied method of teaching.

The developers of "Principles of Technology" hope to use this course to target a large group of high school students--those enrolled in the "general track."

"I worry about those 39 percent in the general track--many of whom are bright and capable students--who are not directed toward any productive goal. They are simply wandering around lost for the most part, and will graduate from high school unprepared for academics or skilled jobs."

According to the National Longitudinal Study of the Class of 1980, about 34 percent of high school students are in the college preparatory program, 27 percent are in

job training programs, and 39 percent are enrolled in a general track, with little or no direction. It is this largest group of high school students, the 39 percent who are unsure and/or unmotivated, that the "Principles of Technology" course could affect most positively. By utilizing an applied, "hands-on" approach to provide this group with more academics, opportunities to either continue their education or enter the labor force with useful, saleable skills would be greatly enhanced.

APPLIED VOCATIONAL MATHEMATICS

Moody Oswald
Director
Vocational Education Office
South Carolina Department of Education

South Carolina's process to develop a course in applied vocational math began in 1981--two years after local vocational directors voiced concerns that math was one of the major problem areas in student achievement and two years before the education reform legislation was passed. The decision to create a new course stemmed from the fact that existing materials for applied vocational math were directed toward specific training programs. A broader course was desired--one that would bridge the gap between academics and vocational education and improve the math skills of all students.

The development and implementation of the course in applied vocational mathematics were based on two major premises: 1) certain applied mathematical principles are common to many vocational program areas and almost all vocational programs already have specific applied math instructional materials; and 2) once the common applied math competencies were identified, a course could be developed that would be relevant to all vocational programs and, at the same time, satisfy the additional math course requirement mandated for graduation from high school.

> *"When we started exploring the possibility of an applied math course, we knew there was a great need to improve the math skills of not only vocational students, but of all high school students."*

A committee consisting of math and vocational teachers and representatives from the private sector took the first step in the slow process of developing the applied math course by reviewing current instructional materials. Faculty from each vocational program area were asked to identify the math competencies essential to that particular occupational field. At the same time, a similar committee reviewed the general math courses already in place to determine if current curriculum materials could serve as a foundation for the development of an applied vocational math course. The committee concluded that existing materials could not be adapted, and the decision was made to create a new course.

A curriculum committee, consisting of math and vocational instructors, was then established and given the list of competencies identified as being essential to specific vocational program areas. Upon reviewing these competencies, the committee made the following recommendations: 1) since the primary need for the course was in trade and industry programs, the majority of the curriculum development should center around the competencies in these areas; 2) specific knowledge in ratios, percentages, decimals, fractions, and basic principles of geometry is germane to all programs of study in vocational education; 3) the new course should address the fact

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"We did not want to develop something totally separate for vocational education; we sought to create a course that would be useful and beneficial to both academic and vocational education."

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that certain vocational programs require a higher degree of math knowledge than was being offered in the general math curriculum; and 4) the new curriculum should be developed and implemented as a separate math course with supplemental units for vocational teachers who need materials to reinforce math skills in their particular program of study.

The purpose of the curriculum development process was not to create another basic math course but rather to provide a means of teaching all students problem-solving and computational skills utilizing the basic math skills they already possess. The curriculum for the applied vocational math course is competency-based and is organized around the following skills: problem-solving with a calculator, measurements, basic algebra and geometry, ratios, proportions, percentages, graphs and tables, money, and time. The course is taught in the math department by certified math teachers. Vocational teachers become involved when they pull

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"The beauty of this course is that it is organized in such a way that the machine shop instructor can easily use portions of it to reinforce the specific math skills needed in that shop."

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relevant parts of the course material and apply it to their particular program. It is unlikely that the applied math course will ever be a prerequisite for entry into a vocational program. However, with the required additional unit of math for

graduation, most vocational students will enroll in the course prior to or during their first year in a vocational program.

The curriculum for the course was completed in July 1984; a two-day teacher in-service was held during the same month. The in-service, developed by state-level math and trade and industry consultants, was held primarily to show vocational teachers how to use the course materials as an integral part of their skill development program.

"In order for this course to be successful, the real in-service has to take place at the local level between instructional leaders in the math and vocational departments. I am happy to say that the communication between these two groups has already started to happen."

During the first year of implementation, 18 sites offered applied vocational math as a math credit for high school graduation. Since the course is only in its third year, it is too early to provide any quantitative data as to its effectiveness. However, a system is in place that will monitor the performance of students enrolled in the course on the math portion of the South Carolina Basic Skills Test. Based on feedback from the sites implementing the course, results have been very positive and student interest is extremely high due to the ease with which they can relate the applied math competencies to their career aspirations.

CORRELATED VOCATIONAL/ACADEMIC PROGRAMS

Darrell Parks
Director
Division of Vocational Education
Ohio Department of Education

Correlated vocational/academic programs address the need for, and provide the strategy to accommodate, change in vocational education in Ohio brought about by the national focus on educational excellence, more stringent secondary standards, and the clear and consistent message from business and industry of the need for the improved competency of workers in the areas of math, science, and communication. These correlated programs attempt to make vocational education more attractive to a broader base of students, provide additional scheduling flexibility to local education agencies, and complement the revised standards for high school graduation.

Development of the programs was based on three assumptions: 1) existing vocational programs contain significant content in math, science, and communication skills that can be identified and organized into applied academic offerings; 2) increased emphasis on academic components and core competencies will not jeopardize the

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"We have been too generous in the amount of time devoted to vocational skills at the expense of developing the core competencies and cognitive skills vocational students need."

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quality of occupational skill training offered in vocational programs; and 3) teachers will not use anything they have not had a part in developing.

Based on these assumptions, eight different approaches were designed and implemented as pilot programs during the 1983-84 and 1984-85 school years. Six of the eight approaches were revised and refined and are currently in the first year of a more comprehensive implementation process. These six program options, which are shown below, have been endorsed by the Division of Elementary and Secondary Education to ensure that vocational students enrolled in the programs were directed not only toward the development of occupational skills, but also toward meeting increased academic requirements for graduation.

Students can spend up to 4 1/2 hours of the 6-hour day in vocational education courses--two 40-minute blocks of related technical instruction and a three-hour block of lab and/or skill instruction. To correlate academics with vocational training, the standard vocational options were reorganized in such a way that

applied academic courses are taught in one or both of the related technical instruction blocks, thus moving the technical instruction into the lab/skill block.

"The State of Ohio was rapidly moving toward placing students in the position of having to choose between enrolling in a vocational program or graduating."

This type of reorganization enhances core competency instruction and affords students the opportunity to obtain additional academic credits.

For the 1985-86 academic year, 31 institutions met all of the special considerations required for participation and are involved in the comprehensive implementation of the correlated vocational/academic programs. One of the key considerations required the 571 academic and vocational teachers involved in the programs to attend

Program Type	Correlated Academic Instruction (minimum/day)	Uninterrupted Vocational Lab/Skill Instruction (minimum/day)	Related Technical Instruction (minimum/day)
Standard			
Option 1		150 minutes	80 minutes
Option 2		150 minutes	40 minutes
Option 3		150 minutes--20% of time must be related technical instruction	
Correlated			
Option 1	80 minutes (2 credits)	150 minutes--20% of time must be related technical instruction	
Option 2	Grades 11 and 12 40 minutes 1 semester (1/2 credit)	150 minutes	Grades 11 and 12 40 minutes 1 semester 80 minutes 1 semester (1 1/2 credits)
Option 3	40 minutes (1 credit)	150 minutes--20% of time must be related technical instruction	

an in-service workshop related to the correlation of academic and vocational instruction. The purpose of the in-service was to bring together the teachers and math, science, and language consultants to develop a program of study which identifies the necessary competencies and organizes them in a way that is teachable and coordinated with the lab experiences students will receive. Prior to implementation this program of study had to be approved by the Division of Elementary and Secondary Education and the Division of Vocational Education to assure that the course content was worthy of academic credit. Other special considerations are: 1) academic instruction is limited to applied courses in math, science, and communications; 2) all vocational and academic teachers must be properly certified in their respective areas; 3) only vocational students may be enrolled in the correlated academic classes, with a maximum class size of 25; and 4) regularly scheduled and unobligated time, either daily or weekly, must be provided for vocational teachers to plan and correlate with the appropriate academic teachers.

"One teacher commented that for the first time in 10 years of teaching, the entire class was excited about the math she was teaching. Asked why they were excited, she replied, 'Because they all know that the next couple of days they will use it in a real-life setting.'"

Instructors have noted many positive aspects, such as increased time on task and greater student access to vocational education with the ability to meet new graduation requirements. Teachers also point out that student practice time in the labs can be shortened without affecting the degree of skill achievement. Since time spent in related technical instruction has been reduced, more homework is assigned and students are accepting more responsibility for their success. Much of the feedback provided very positive results from the scheduled correlation time between academic and vocational teachers, especially when they are located in the same office area. The instructors tend to communicate more and be much more effective in correlating academic content with vocational lab experiences.

Several disadvantages, however, have been identified in the correlated programs--there cannot be universal application of credit due to the fact that some programs, such as child care and cosmetology, do not have sufficient math and science content to warrant granting credit; teachers encounter problems when confronted with the wide range of student abilities in the correlated academic

courses; the teacher correlation requirement can cause scheduling conflicts; student off-site experience is limited because they can no longer leave the campus for a full day and make up the missed work; and finally, the need for vocational teachers will diminish, possibly by as much as 40 percent.

Although test results from the comprehensive implementation effort are not complete, data from the pilot efforts show very positive effects. One school that is able to offer two programs in each of six different areas was willing to pre- and post-test students involved in the pilot effort, using nationally-standardized tests

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"Teachers are talking to each other and have a spirit of community and a sense of common purpose that will pay dividends down the road."

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in math and science and a vocational achievement test in occupationally-specific areas. When compared with students who did not go through the correlated program, students involved in five of the six pilot programs showed greater gains in math and science, and scored higher on the vocational achievement test. It is anticipated that results from the current implementation effort will show equal, if not more significant, gains as a result of the correlated vocational/academic approach.

INDIVIDUALIZED REMEDIAL-RELATED CENTERS

Margaret Johnson
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Ridgeland Campus
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Mississippi

Centers to identify and remediate basic skills deficiencies of adult and high school vocational students are located in area vocational schools in Mississippi. Because so many students are deficient in at least one basic-skills area, there are

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"We get high school graduates who can function only on the 5th-grade level, and I doubt that our students in Mississippi are any different than those in other states."

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not enough resources or time to allow all of them to work in the centers. Instead, students with the lowest basic-skill levels or those that can most benefit from working in the centers are identified and enrolled in the remedial-related program. During the 1984-85 academic year, approximately eight percent of the total number of students in vocational programs participated in the centers' basic-skills remediation.

The individualized remedial-related centers are operated as open labs. Students work at their own pace under the supervision of "learning managers"--teachers who check to be sure that students are on task and making progress. A strictly individualized study schedule is created for students based on their career goals, the skill-levels required by the program in which they are enrolled, and on results from the Test of Adult Basic Education--the diagnostic tool used to identify skill

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"If students function only at the 8th-grade level, they will not be able to succeed in many of the vocational programs offered in Mississippi."

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deficencies in the areas of reading comprehension, reading vocabulary, arithmetic reasoning, arithmetic fundamentals, and mechanics of English and spelling. Materials taken from various sources--published workbooks, computer software, audio tapes, and teacher-developed materials--are formulated into modules that address a

specific skill at a specific grade level in each of the major areas. After completing a module, which can take anywhere from 30 minutes to two hours, a student must score 85 percent on a test before moving on to the next task. If that score is not achieved, the learning manager works with the student to identify problems and provide additional materials to try to correct the deficiencies.

An individualized approach is used because it attends to the very special needs of the students involved in the remedial-related program. In the traditional classroom lecture environment, these students have been told by their teachers, peers, and grades that they were dumb--they learned to hate teachers and to hate school and, most tragically, they learned that they were incapable of learning. By utilizing the individualized study schedules, students build self-confidence by working at their own pace and learning on their own. Students come to realize that they are not dependent on the learning managers to learn; rather, the learning managers are there to offer help if it is needed.

The learning managers are generally certified in English, reading, mathematics, or elementary education and, due to the special needs of the students, supervise no more than 15 students at one time. Because the students and the environment of the remedial-related program are so unique, learning managers need to possess certain characteristics to be effective. They must be flexible since there are no course outlines or day-to-day lesson plans. They must be able to motivate the students and be firm in keeping them on task, but the learning managers must also be able to recognize when students are frustrated with the material. Learning managers must be available to the students at all times. Finally, they must be experts at building rapport with the vocational instructors and with the students. This involves going into the shops and seeing how the students perform on their "own turf." Most of the

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"It is hard to do in one semester or one year what has not been done in the previous 12 years."

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personnel time is spent improving procedures for administering tests, writing and managing student study schedules, evaluating and recording data, and, most importantly, providing individual attention to the students.

Students are sent from feeder institutions to receive approximately 15 hours of vocational instruction each week at area vocational schools. Students participating in the remedial-related program spend anywhere from one and one-half to five hours

per week in the open lab. Rather than miss class lectures and demonstrations, vocational instructors prefer that students work in the remedial-related center during the manipulative skill training labs that follow the regular class demonstrations. Some students complete their study schedule in one semester; others need three semesters. Upon completion of the study schedule, students are tested to

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"Considering the time we have with the students, we think our advances in skill levels are commendable."

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measure their progress and results have been very positive. In one program, reading levels went from grade 7.8 to 9.4; math improved from grade 7.8 to 9.2; and the language level rose from grade 8.2 to 9.2. This overall improvement clearly demonstrates that the individualized approach used in these centers is an effective way to motivate traditionally poor students to remediate their basic-skills deficiencies.

LEARNING RESOURCE CENTERS

Marilyn Smith
Reading Specialist
Tulsa County Area
Vocational-Technical School
Oklahoma

The Learning Resource Center concept was first introduced in southeastern Oklahoma after numerous studies revealed that prevailing disadvantaged economic, educational, and social conditions in that area resulted from a lack of quality educational opportunities. In 1970, a center was established in one of the area vocational schools to motivate students to achieve higher levels of basic skills proficiency by providing individualized remedial instruction related to specific vocational progrms. As a result of the success of this first center, funding was provided in 1975 to develop and implement a three-year pilot Learning Resource Center in central Oklahoma so that objectives, methods, and instructional materials could be identified, defined, and revised. Based on these efforts 32 centers located throughout the state now serve over 9,000 students each year. The basic objective of these centers is to reduce the number of dropouts by creating

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"Getting a student to say 'Hey, I can succeed!' is the most important thing we can do. It is just like opening a door for them and once they get on the track of success, you can hardly turn them back."

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individual programs that provide opportunities for students to achieve success in gaining both academic and vocational skills and knowledge.

Students are invited to enroll in the Learning Resource Center if they score below the 25th percentile on a standardized achievement test, if they have a C- or lower average in either academic or vocational courses, or if they have been referred to the Center by a teacher or counselor. Participation is entirely voluntary; however, students receive extensive counseling prior to making a decision on whether to enroll.

The centers are designed to enhance the educational opportunities of all the different types of students who are enrolled--learning disabled, limited English proficient, physically handicapped, underachievers--by utilizing a variety of techniques that recognize the different learning styles, rates, and abilities of each student. Individualized programs provide remedial work at the appropriate

grade level in reading, math, and communications skills that will reinforce what students are learning in their vocational courses. Students work at their own rate and, in doing so, gain greater independence as they discover that they can succeed

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"The common denominator of these students is that they all need a shot of self-esteem. More than anything, they need to believe in themselves."

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on their own. This is one of the basic goals of the Center--to help students believe in themselves and realize that they have their own unique potential.

Student time in the Learning Resource Center varies according to student needs and the scheduling of vocational training. Since students go to the Center during the time block allocated for vocational training, a good scheduling system can only work through the cooperation of the vocational instructors. Therefore, it is

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"We have to prove to the vocational instructors that we are doing a good job and really making a difference."

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imperative that the vocational instructors see a need for the Learning Resource Center and be made aware of the Center's services, goals, and objectives. Additionally, in order to alleviate peer pressure, all students must be informed that the Center not only offers remedial assistance, but that everyone can benefit from the services it provides.

Teachers in the Learning Resource Center will assume several different roles--counselor, supervisor, instructor, and test administrator and interpretor. All of these roles are essential to providing the most effective and meaningful learning environment possible. To build an effective individualized program,

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"You have to be bright, innovative, hard-working, and excited about this job. Most of all, you have to believe in the students; you have to believe that they can come around. If you do not believe that, you have no business being involved in the Center."

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teachers must be able to establish a rapport with each student and recognize special needs and learning styles. According to a recent poll, teachers in the centers are

effective--of the 294 vocational instructors responding, 86 percent agreed or strongly agreed that the Learning Resource Center instructor possessed a positive image in their vocational school. Because teachers are often the catalyst of the learning process in the Center, they must have the ability to restate, rephrase, and approach problems from many different angles to find the way a student can understand. Finally, teachers need to be well-grounded in academics, have knowledge of computers, and be willing and able to adapt existing vocational materials or create new ones to meet the needs of the students.

Learning Resource Centers contribute to the vocational goals of students and provide opportunities that constantly challenge students to strive toward higher

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"We have opened doors and we have raised self-esteem . . . if those are not results, then I am not sure what to call them."

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levels of learning. The centers have created a different learning environment where students gain greater independence and recognize their own unique potential by succeeding in educational studies at their own rate and in their own style.